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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,687	12/28/2001	Gee Sung Chae	2658-0276P	3606

2292 7590 11/01/2005

BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER

DI GRAZIO, JEANNE A

ART UNIT PAPER NUMBER

2871

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/028,687

Applicant(s)

CHAE, GEE SUNG

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on RCE August 10, 2005.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4, 7-12, 14, 15, 17, 19 and 20 is/are pending in the application.  
4a) Of the above claim(s) 21 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1, 2, 4, 7-12, 14, 15, 17, 19 and 20 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 28 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claims***

Claims 1, 2, 4, 7-12, 14-15, 17 and 19-20 are pending per Applicant's Amendment of August 10, 2005. Claims 1, 9, 10, 12, 14, 15 and 17 have been amended per said Amendment. Claim 21 has previously been withdrawn because it is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claim 21 is drawn to a pixel electrode being electrically connected with a drain electrode *without using a contact hole*. Claims 1-20 are drawn to electrical connections with contact holes.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 21 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Priority***

Priority to Korean Patent Application No. P2001-31514 (June 5, 2001) is claimed.

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 10, 2005 has been entered.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7, 8, 10-12, 17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Japanese Patent Application No. 09-232580 (to Kan et al.) and further in view of United States Patent 6,137,551 (to Jeong) and further in view of United States Patent 5,731,856 (to Kim et al.).

Per claim 1 (amended), 10 and 17: Rho discloses conventional elements of a liquid crystal display and TFT substrate that, with reference to Figure 3, has the following elements: a gate electrode (20) over a substrate (10), a gate insulating film (40) entirely deposited over the substrate (10) to cover the gate electrode (20), an active layer (50) formed on the gate insulating film (40) which overlaps with the gate electrode (20), an ohmic contact layer (71 and 72) formed

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on the active layer (50), a source electrode (80) formed on the ohmic contact layer (71) a drain electrode (90) formed on the ohmic contact layer (72), the drain electrode (90) being opposed to the source electrode (80) to form a channel (Column 4, Line 55), a protective layer (100) covering the source (80) and drain (90) electrodes, a storage electrode (30) formed at a pixel cell area of a same layer as the gate electrode (20), and a pixel electrode (140) formed to oppose the storage electrode (30) having the gate insulating film (40) in between the pixel electrode (140) and the storage electrode (30), and the pixel electrode (140) being electrically connected with the drain electrode (90)(See also Detailed Description of the Embodiments at Column 5, Lines 13-16)(explaining that the pixel electrode is electrically connected to the drain electrode through the contact hole and receives the display signal from the drain electrode to drive the liquid crystal molecules).

Rho does not appear to explicitly specify a buffer layer formed over said source and drain electrodes.

Kan teaches and discloses a transistor and manufacturing method in which buffer layers (30a and 30b of Figures 5 and 6 for example) cover a source layer (28a) and a drain layer (28b).

It would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Kan to control and suppress parasitic capacitance (Abstracts).

Rho does not appear to explicitly specify said storage electrode comprising a transparent conductive material and an auxiliary storage electrode connected to said storage electrode.

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Jeong teaches and discloses a liquid crystal display, thin film transistor array and associated method and a storage capacitor that provides for a high aspect ratio (Title, entire patent).

Figure 7E of Jeong shows a pixel electrode (62) made of a transparent conductive material such as ITO and a first storage electrode also made of a transparent conductive material such as ITO (61). The pixel electrode (=auxiliary storage electrode) is used as a second storage electrode such that the storage capacitor includes a first storage electrode and second storage electrode. These electrodes are transparent (Column 7, Lines 1-10). The electrodes (61 and 62) also connect with each other as can be seen in the figure (pixel and first storage capacitor electrode together form a storage capacitor).

It would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Jeong for high aspect ratio and reduced power consumption from a backlight (Column 7, Lines 1-30).

Rho does not appear to explicitly specify a protective layer covering said source electrode, said drain electrode and some portions of the pixel electrode.

Kim teaches and discloses a liquid crystal display and methods in which, in reference to Figure 18, a protective layer (124) covers a source (120a) and drain (120b) and some portions of a pixel electrode (112).

It would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Kim for reduced manufacturing costs and for fewer photolithography steps (Kim at Column 11, Lines 25-35).

Thus, claims 1, 10 and 17 are rejected.

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As to claim 2, Rho teaches that conventionally, the source electrode (90) is connected with the data line on the protective layer (not shown in Figure 3)(Column 1, Lines 35-36).

Thus, claim 2 is rejected.

As to claim 7, Referring again to Figures 2 and 3 (same embodiment), a data line (81) is perpendicular to a gate line (21) and source (80) and data line (81) are connected.

Thus, claim 7 is rejected.

As to claim 8, In Rho, the gate electrode (20) is a branch of the gate line (21) as shown in Figure 2 (same embodiment as Figure 3) and thus the gate electrode, gate line, and storage electrode are all formed in the same layer.

Thus, claim 8 is rejected.

As to claim 11, The protective layer (100) comprises an organic insulating material (Column 4, Lines 56-60)(See also Column 5, Lines 1-4).

Thus, claim 11 is rejected.

Per claim 12: Applicant's recited method steps of fabricating a liquid crystal display would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made in light of the device as taught and disclosed by Rho and APA Figures 5 and 6D. Specifically Rho teaches and discloses a pixel electrode (140) formed to oppose the storage electrode (30) having the gate insulating film (40) in between the pixel electrode (140) and the storage electrode (30), and the pixel electrode (140) being electrically connected with the drain electrode (90)(See also Detailed Description of the Embodiments at Column 5, Lines 13-16)(explaining that the pixel electrode is electrically connected to the drain electrode through the

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contact hole and receives the display signal from the drain electrode to drive the liquid crystal molecules).

Thus, claim 12 is rejected.

As to claims 19 and 20, the protective layer comprises an organic insulating material (Column 4, Lines 56-60)(See also Column 5, Lines 1-4).

Thus, claims 19 and 20 are rejected.

Claims 4, 9, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Japanese Patent Application No. 09-232580 (to Kan et al.) and further in view of United States Patent 6,137,551 (to Jeong) and further in view of United States Patent 5,731,856 (to Kim et al.) and further in view of Shimada et al. (US 6,424,399 B1).

Per claims 4, 9 and 14-15: Rho does not appear to explicitly specify that the source and drain electrodes further comprise a buffer metal layer of molybdenum, titanium, or tantalum.

Shimada teaches and discloses an active matrix substrate and liquid crystal display in which a conventional liquid crystal device has source and drain electrodes made of titanium or molybdenum (Column 2, Lines 23-32). It may be presumed that the molybdenum or titanium source and drain electrodes reduce contact resistance.

Shimada is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to include a source and drain electrode of molybdenum or titanium for continuity of contact hole thereby contributing to excellent image characteristics (Column 8, Lines 4-13).



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Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Shimada for source and drain electrodes of molybdenum or titanium for continuity of contact hole thereby contributing to excellent image characteristics (Column 8, Lines 4-13).

Thus, claims 4, 9 and 14-15 are rejected.

***Response to Arguments***

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Regarding Applicant's Declaration Under 37 C.F.R. Section 1.132, the issue is moot in view of United States Patent 5,731,856 (to Kim et al.).

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289.


The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeanne Andrea Di Grazio  
Patent Examiner  
Art Unit 2871

JDG

  
ANDREW SCHECHTER  
PRIMARY EXAMINER